Coastal Fortifications and National Military Policy, 1815-1835

A Monograph

by

MAJ Clinton W. Brown
United States Army

School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

2015-01

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
07-04-2015	Master's Thesis	JUN 2014 – MAY 2015

4. TITLE AND SUBTITLE
Coastal Fortifications and National Military Policy, 1815-1835

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
MAJ Clinton Brown

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Command and General Staff College
ATTN: ATZL-SWD-GD
Fort Leavenworth, KS 66027-2301

8. PERFORMING ORG REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Advanced Military Studies Program

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution is Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

Coastal fortifications in the United States developed from the colonial practice of building temporary structures to a system designed to be permanent and enduring. Coastal fortifications became a focus of national military policy after the War of 1812. The First and Second Systems were evolutionary steps in fortification construction, but a lack of a national military policy providing guidance resulted in an incoherent system.

The Board Report of 1821, based on policy guidance from presidents James Madison and James Monroe, provided a roadmap for the establishment of the Third System and coastal fortifications based on coherent policy. This monograph analyzes the history of American coastal fortifications from the colonial period to the Third System. From this perspective it will show the evolution of coastal fortifications in relation to national military policy.

15. SUBJECT TERMS
Coastal Fortifications; The Third System; The Board Report of 1821; Corps of Engineers; National military policy; Congressional appropriations

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
					MAJ Clinton Brown
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. PHONE NUMBER** *(include area code)*
(U)	(U)	(U)	(U)	49	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

Monograph Approval Page

Name of Candidate: MAJ Clinton W. Brown

Monograph Title: Coastal Fortifications and National Military Policy, 1815-35

Approved by:

_____, Monograph Director
Ricardo A. Herrera, PhD

_____, Seminar Leader
Yan Poirier, LCOL (Canadian Army)

_____, Director, School of Advanced Military Studies
Henry A. Arnold III, COL

Accepted this 22nd day of May 2015 by:

_____, Director, Graduate Degree Programs
Robert F. Baumann, PhD

Abstract

Coastal Fortifications and National Military Policy, 1815-1835, by MAJ Clinton W. Brown, 49 pages.

Coastal fortifications in the United States developed from the colonial practice of building temporary structures to a system designed to be permanent and enduring. Coastal fortifications became a focus of national military policy after the War of 1812. The First and Second Systems were evolutionary steps in fortification construction, but a lack of a national military policy providing guidance resulted in an incoherent system. The Board Report of 1821, based on policy guidance from presidents James Madison and James Monroe, provided a roadmap for the establishment of the Third System and coastal fortifications based on coherent policy. This monograph analyzes the history of American coastal fortifications from the colonial period to the Third System. From this perspective, it will show the evolution of coastal fortifications in relation to national military policy.

Contents

Acknowledgements

My wife is always the one who I look to for support and encouragement, and she deserves my admiration. Without her unwavering support, I would not be able to work towards the goals set before me. My kids, who are growing too fast, also deserve credit for being patient with me while I focus on my work and not spilling apple juice on my laptop.

To Dr. Rick Herrera at the School for Advanced Military Studies for his support, mentorship and guidance. He has been an inspiration and made it fulfilling to keep working towards a better project.

Figure

Introduction

The early period of the United States saw the development of a coherent system of fortifications that lasted into the 20th century. Coastal fortifications were a critical piece of an integrated system of defense. The establishment of fortifications did not happen through a single act of Congress or by the introduction of a coherent strategy that brought together the various elements of an integrated defense all at once. Early fortification development was the result of a particular crisis. However, the years spanning 1815-1835 were unique and allowed for fortification development in the absence of crisis.

From 1793 through 1815, the United States went through two distinct stages of coastal fortification planning and construction. Both of these stages, the First and Second Systems, occurred during periods of national emergency. Before the American Revolution, the then-British colonies had constructed but a few permanent fortifications. The threat of invasion was relatively small. The lack of a direct threat was largely the result of two major factors. First was the natural composition of the borders, which had two large bodies of water on both the Atlantic and Gulf coasts. As British colonies, the powerful Royal Navy had provided a strong deterrent against invasion. After the Revolution, however, the Royal Navy was no longer a partner, but was now a potential adversary, and the threat of seaborne invasion became a serious cause for concern among Americans living along the vulnerable coastal areas. The potential threat increased as the United States expanded westward, eventually taking in portions of the Gulf Coast. These potential attacks threatened to severely disrupt trade and commerce. It became clear after the War of 1812 that the United States needed to establish a better system for the construction of permanent coastal fortification. These fortifications thereafter became an integral part of the national defense of the United States.

The construction of coastal fortifications from 1815-1835 was an integral part of the development of a national military policy in the early republic. The lack of permanent coastal fortifications during the colonial period had left the colonies without an existing infrastructure.

The early systems[1] of fortifications had developed in response to national emergencies, but were not part of an integrated system of continental or coastal defense. The long period of peace that followed 1815 allowed national leaders time to establish a long-term system. This action led to the establishment of the Board of Engineers in 1817. The Board of Engineers wrote what is generally known as the Board Report of 1821, which secured long-term support from Congress for appropriations and the necessary support from West Point. Thus, the resulting system of fortifications became the first foundation for a national military policy relying on deterrence and defense.

Colonial and British authorities had constructed few coastal fortifications, choosing instead to economize through the strength of the Royal Navy. The Royal Navy's ability to provide protection was essential for colonial commerce. The American Revolution, however, changed the relationship between Great Britain and the former colonies from friendly to adversarial, making the ports and commercial cities vulnerable targets to the former mother country. American commanders had to either use the few fortifications that existed or to construct hasty defensive works supported by expertise from foreign officers. Thus, after the Revolution, Congress and the presidents grappled with how to solve the problem of defending American commercial, population, and political centers. The coastal fortifications constructed between 1794 and 1812 were neither coherent nor were they integrated. However, this approach to early fortifications led to the development of a true system of fortification, the Third System, and the development of a national military policy.

The War of 1812 had proven to national leaders that the modes of fortification from the earlier systems were insufficient. In response, Congress established the Board of Engineers in 1817 in an effort to centralize the planning and processes for construction. The members of the board conducted numerous surveys and submitted their findings to Congress; the first significant

[1] The term "system" in this monograph refers to the period of time when the fortifications were constructed.

report being the Board Report of 1821.This report directly influenced early national military policy by creating a model for its implementation. The lengthy period of relative peace following the War of 1812 made the process much easier. The new system was different. It received an annual appropriation from Congress for long-term construction and maintenance. Importantly, coastal fortifications were critical for the expansion of the navy, and thus represented a significant element of the creation of an early comprehensive national defense policy. Other aspects outlined in the Board Report included the creation of a strong regular force augmentable by militia and the further development of interior lines of communication. All of this was critical to the development of the United States' national military policy.

The Board Report of 1821 set the foundation for the Early Republic's national military policy. Reinforcing this policy was a stronger emphasis on the education of engineer officers at West Point and a clear strategy that supported the policy. Many projects the Board Report of 1821 identified were integral to national military policy. However, before the other projects, such as the expansion of the navy, could receive the monetary attention from Congress, coastal fortifications had to be constructed. Coastal fortifications could provide protection to the navy, its yards, and critical harbors.

Several books cover the subject of coastal defense as part of national military policy. Critical to this research and many others is Robert Browning III's *Two if by Sea: The Development of American Coastal Defense Policy*.[2] Browning describes how coastal defense policy evolved from the colonial period through the early-twentieth century. He argues that coastal defense, as a part of national military policy, helped to deter aggression as well as defend coastal cities and harbors. Although Browning is attempting to prove a negative, a logical fallacy, his argument has some merit within it. He demonstrates that coastal defenses were not just a form

[2] Robert Browning, *Two If By Sea: The Development of American Coastal Defense Policy* (Westport, CT: Greenwood Press, 1983).

of defense during times of war, but part of a developing integrated system of coastal defense. David Clary also addresses the role of coastal defense as a deterrent his book *Fortress America: The Corps of Engineers, Hampton Roads, and United States Coastal Defense*.[3] Clary provides clarity for much of the Congressional debates of the time and addresses the factors influencing the development of a national military policy. The two most important factors were first the competing interests for funding and secondly disagreements on the utility of coastal fortifications. Those disagreements resulted in tense debates within Congress over appropriations. Occasionally these debates led to the suspension in funding for fortifications. *Seacoast Fortifications of the United States: An Introductory History* by Emmanuel Lewis goes into more depth and analysis of the construction of projects and how they evolved over time.[4]

In 2004, Mark Smith wrote "The Corps of Engineers and National Defense in Antebellum America, 1815-1860."[5] Smith provides an understanding of the development of coastal fortification construction from the perspective of the Corps of Engineers. He addresses Congressional support, and the strains that took place with Western expansion and increased competition for funding. Previously, in 1999, Russell Price wrote "American Coastal Defense: The Third System of Fortification, 1816-1864," which focused almost exclusively on fortification design.[6] Price demonstrates that the later designs of fortifications were the result of a pursuit toward a common system of defense.

---

[3] David Clary, *Fortress America: The Corps of Engineers, Hampton Roads, and United States Coastal Defense* (Charlottesville: University Press of Virginia, 1990).

[4] Emmanuel Lewis, *Seacoast Fortifications: An Introductory History* (Annapolis: Naval Institute Press, 1970).

[5] Mark A. Smith, "The Corps of Engineers and National Defense in Antebellum America, 1815-1860" (PhD diss., University of Alabama, 2004).

[6] Russell Price, "American Coastal Defense: The Third System of Fortifications, 1816-1864" (PhD diss., Mississippi State University, 1999).

The papers of presidents James Monroe and James Madison are useful in understanding the nature of strategic thought with these presidents.[7] Secretaries of war Henry Knox and John C. Calhoun also wrote on the importance of coastal fortifications and were key supporters of fortification projects.[8] Jonathan Swift was an influential American engineer who influenced the development of fortifications before, during and after the War of 1812 providing a perspective on the motivations and intent behind the creation of the system. [9] The Board Report of 1821 is also critical to this research.[10] This report outlines the long-term national military policy of coastal fortifications and how it became a true system.

English Colonies and Coastal Fortification

> "As an auxiliary to the state of our defense, to which Congress can never too frequently recur, they will not omit to inquire whether the fortifications which have been already licensed by law be commensurate with our exigencies."
>
> —George Washington November 1794[11]

The development of coastal defenses and fortification in America was a gradual one. Distinct periods of development, separated by periods of general neglect or outright abandonment marked them. Three critical stages marked the development of early American fortifications.

---

[7] James D. Richardson, ed, *A Compilation of the Messages and Papers of the Presidents, 1789-1897* (Washington, DC: Government Printing Office, 1896).

[8] Mark Puls, *Henry Knox: Visionary General of the American Revolution* (New York: Palgrave Macmilan, 2008); Roger Spiller, "John C. Calhoun as Secretary of War, 1817-1825" (PhD diss., Louisiana State University, 1977).

[9] Joseph Swift, *The Memoirs of Gen. Joseph Swift, First Graduate of the United States Military Academy, West Point, Chief Engineer U.S.A. from 1812 to 1818* (Privately Published, 1890).

[10] Simón Bernard, J.D. Elliot, Joseph Totten, "The Board Report of 1821" (Washington, DC: Gales & Seaton, 1821).

[11] Richardson, *A Compilation of the Messages and Papers of the Presidents, 1789-1897*, 167.

First, English colonial coastal fortification construction was the responsibility of the local governments. The primary threat to English colonies was from potential Native American raids, which did not represent seaborne threats. The British navy, especially after the Seven Years War, was strong enough to protect commercial centers located on the sea.[12] Many of these fortifications deteriorated soon after use, and colonists quickly abandoned them. Second, the American Revolution exposed the ports that once had the protection of the British navy to its attack. The few fortifications that existed at the outbreak of the Revolution were insufficient to defend against the Royal Navy, and the British destroyed many of them before they fell into American hands.[13] The final stage was the establishment of the First and Second systems of fortifications. The construction of the First System occurred from 1794-1802, followed by the Second System from 1807-1812.[14] These two systems came into existence through Congressional action. However, despite their establishment by the national government, there was not a unifying plan that made them effective. The ineffective coastal defense of the early republic had a dramatic effect during the War of 1812.

The first stage in the development of coastal fortifications was the minimal role permanent fortifications played in English colonies. The early colonies constructed coastal fortifications as needed, then typically abandoned them. Isolation, lack of supplies, and the expenses associated with coastal fortification construction led the English colonies to rely upon

[12] Joseph Russo, *Continental Defense of the United States: A Summary History from the 1700s through 1990* (El Paso: n.p., 1992), 3.

[13] Robert Arthur, "Coast Forts of Colonial Massachusetts," *The Coast Artillery Journal*, 58, no. 2 (February 1923): 118. As the British evacuated Castle Island in Massachusetts Bay, they "threw the projectiles in the water, broke the trunnions off the guns, destroyed the military stores, and blew up the fort."

[14] Lewis, *Seacoast Fortifications,* 21-33.

local materials such as timber, earth, sod, palmettos in the south, or even tapia concrete.[15] Fort Johnston, South Carolina, built in 1744 almost entirely from tapia, was virtually useless because of the fragile nature of these local materials. Each time a cannon fired from the parapets, "large chunks would fall out."[16] Fort Frederica, constructed in 1736 in Georgia to guard access to the Savannah River, was is such poor condition in 1754 that it could not support the weight of 20 cannon.[17] Impermanence, fragility, and a lack of thorough forethought were the hallmarks of most colonial fortifications.

Professional engineers did not design British colonial fortifications in North America. Other European powers, such as Spain and France however, utilized military officers educated in the scientific construction of fortifications. Thus, British coastal fortification design did not conform to traditional designs as found in other colonies. Much of this was due to the lack of engineers, but also to the poor preparation of army engineering officers. It was not necessary for an officer in the Corps of Royal Engineers to have a technical education or formal examination until 1741.[18] The construction of forts on the American coastline developed haphazardly, conforming to the terrain rather than applying any particular mathematical principles.[19]

---

[15] Robert Arthur, "Colonial Coast Forts of the South Atlantic," *The Coast Artillery Journal* 70, no. 1 (January 1929): 53. Tapia, or tabby, was a mix of "oyster shells, lime and sand," and when mixed with water created a hardened structure.

[16] Arthur, "Colonial Coast Forts of the South Atlantic," 54.

[17] J.E. Kaufman and H.W. Kaufman, *Fortress America: The Forts that Defended America 1600 to the Present* (Cambridge, MA: Da Capo Press, 2004), 52. On the state of the fortifications, see Browning, *Two if By Sea*, 5.

[18] Christopher Duffy, *The Fortress in the Age of Vauban and Frederick The Great 1660-1789: Siege Warfare*, vol. 2 (London: Routledge & Kegan Paul, 1985), 257. The British began to demand the technical education for engineers with the founding of Woolwich in 1741.

[19] Lewis, *Seacoast Fortifications of the United States*, 15.

A few British colonies did adopt particular designs for their defense, such as Jamestown, Virginia in 1607 where a triangular fort was constructed.[20] This economical approach balanced manpower necessary for the establishment of the colony and manpower necessary for defense. The triangular design was simple to construct and easy to man. Trained engineers, such as Jean-Nicolas Desandrouins of France, bemoaned the use of timber and local materials as insufficient and improper, stating, "most of the forts show no sign of common sense."[21] Major George Washington inspected forts in Virginia in 1756 and found the garrisons poorly manned, poorly equipped, and suffering from "indolence and irregularity."[22] For the English colonies, the ability to support the construction and manning of fortifications was limited during times of peace.

Coastal fortification construction during the French and Indian War, as in previous decades, was temporary. After the war, colonists abandoned the fortifications and left them until the American Revolution. Castle William in Boston, for example, served as an inoculation site for smallpox in 1764 and in the following year a storage site for the hated stamps of the Stamp Act, enacted by Parliament to pay for, among other things, the few coastal fortifications that existed.[23] As coastal fortifications deteriorated, British colonies returned to their reliance on the British navy for safety.[24]

The second stage of development occurred during the American Revolution. The War of Independence punctuated the need for a comprehensive system of fortifications that could protect commercial and trading entrepôts. Americans could no longer rely on the Royal Navy. The view

---

[20] Allan Millet, Peter Maslowski, and William Freis, *For the Common Defense: A Military History of the United States from 1606-2012* (New York: Free Press, 1984), 2.

[21] Duffy, *The Fortress*, 271.

[22] Duffy, *The Fortress*, 270.

[23] Arthur, "Coast Forts of Colonial Massachusetts," 116-117.

[24] Browning, *Two If By Sea*, 5.

that British colonists had of permanent fortifications set the Americans up for near disaster at the outbreak of the American Revolution. The Americans controlled many of the ports in 1776. However, many critical harbors lacked fortifications and did not have sufficient forces to defend them, nor did the United States have a navy of any consequence that could deter British ships. As a result, the Continental Army focused construction efforts at critical locations and had to contend with a British army that was able to use the sea as a line of communication.

During the first few years of the war, amateur American engineers learned from experience and through books. American officers providing some engineer advice, such as Jeduthan Baldwin and Richard Gridley, were able to construct some well-designed fortifications earning British respect, but only because their British opponents thought that French engineers had designed them.[25] Foreign officers did, of course, provide expertise to the Continental Army during the Revolution, and afterwards the United States continued to rely on French engineers to design and construct coastal fortifications.

The third stage in the development of coastal fortifications was the establishment of the First and Second systems. At the urging of President George Washington, Congress passed an appropriation in 1794 of $76,100 for the construction of defenses.[26] The cost of the coastal fortifications included an allocation for 200 cannons, which was $97,000. The total cost of the project reached an estimated cost of $173,000.[27] Secretary of War Henry Knox directed engineers to begin construction, and ordered them to keep a close eye on the costs of construction. Because

[25] Duffy, *The Fortress*, 275-276. Richard Gridley assisted in the construction of the redoubt at Breed's Hill around Boston. The British noted that these works were "well finished and extremely well planned by engineers supposed to be French and Swedes."

[26] Price, "American Coastal Defense," 17. The author notes provides a total of $61,800 appropriated, but notes that this amount is an adjusted amount to the 1851 equivalent. The number $76,100 is the actual amount appropriated in 1794 and not adjusted to inflation.

[27] Mark Puls, *Henry Knox:Visionary General of The American Revolution* (New York: Palgrave Macmillan, 2008), 215.

of these reasons, coastal defense fortifications evolved in style and purpose in the United States. The army built the First System from 1794-1802 and was essentially a continuation of colonial practices. Despite appropriations and supervision by engineers, the system had a lack of permanence and support that would be representative of a true system of fortifications

In 1793, as relations with Great Britain began to sour again, President Washington urged Congress to begin the construction of coastal defenses.[28] Uninterrupted trade at the sea was vital for the American economy. Key harbors, operating as centers of commerce and trade, required the construction of coastal fortifications for protection. Coastal fortifications were also integral to the development of a stronger navy. The United States was no longer able to rely on the British navy for protection of commerce, and undefended centers of trade and harbors were lucrative targets. The construction of permanent fortifications required skills and knowledge that was not resident in the United States.

The United States relied heavily upon foreign officers trained in engineering for support during the American Revolution. Knox employed them again during the construction of the First System, including Stephen Rochenfontaine and Pierre Charles L'Enfant.[29] Some fortifications were small and constructed with materials that eroded over time. According to engineer publications on these early works, fortification design included "earthen parapets revetted with timber or sod," which did little to increase their permanence.[30] Others, however, were more permanent in nature, such as Fort Constitution in Portsmouth Harbor, New Hampshire and Fort

[28] Russell Price, "American Coastline Defense: The Third System of Fortification, 1816-1864" (PhD diss., Mississippi State University, 1999), 17.

[29] Price, "American Coastal Defense," 17.

[30] Eben Wilson, "Lectures on Seacoast Defense" Occasional Paper 35, Engineer School, United States Army (Washington Barracks, DC: Press of the Engineer School, 1909). The term revetted refers to constructing and reinforcing the fortification, in this case with timbers or sod.

Independence in Boston Harbor, Massachusetts.[31] The variations in fort design stemmed from several issues. First, Knox left the design and construction in the hands of the local engineers and approval was ultimately up to the state. In a letter to Charles Vincent, who prepared the defenses at New York City, Knox wrote "[T]he choice of the ground…with all the combinations and effects depending thereon, will rest upon your judgment."[32] Second, the use of foreign officers affected the style of fortification. Officers hailed from different parts of Europe, including France and Poland. By this time, the French styles of fortification were already falling out of style with other parts of Europe, but still used in American fortification designs. Finally, the Quasi-War in 1794 compelled engineers to construct more permanent fortifications using brick and masonry in their designs.[33]

The Development of the First System of Fortifications

In 1785, not long after the Revolution had ended, the Continental Congress sold off the remaining vessels of the Continental Navy and disbanded it along with the Continental Marine Corps. Only the Continental Army, in its new guise as the United States Army remained. However, as the century closed, the United States faced challenges to its commercial interests abroad. In 1797, President John Adams wrote to Congress "[A]ny serious and permanent injury to commerce would not fail to produce the most embarrassing disorders."[34] President Adams saw that the most effective way to prevent a "serious and permanent injury" was to build a strong navy supported by coastal fortifications. Congressional action in the early 1790s was an effort to rebuild the navy. Congress passed a resolution 1793 approving a "naval force, adequate to the

[31] Wilson, "Lectures on Seacoast Defense," 2.

[32] Browning, *Two if by Sea*, 9.

[33] Price, "American Coastal Defense," 17-19.

[34] Browning, *Two if by Sea*, 9.

protection of the commerce of the United States against the Algerian corsairs, ought to be provided."[35] However, by 1803, the United States had constructed only six frigates and a handful of other ships-of-the-line at the cost of $688,888.[36]

The relationship between American coastal fortifications and the navy was born at this time. There had been arguments during the development of the First System on the scope and role of coastal fortifications needed, as well as the size and capabilities of the navy. Members of Congress disagreed on the appropriate approach to defend America's coast from invasion. Essentially, there were two schools of thought. The first was that a powerful navy could project power wherever was necessary, either along the coast or across the ocean. This approach speaks to a view of a strong military in support of an active and engaged diplomacy. The second idea was that harbor and seacoast fortifications could protect key areas from foreign intervention. This approach afforded America the opportunity to trade as a neutral nation to Europe. After much debate, the second idea won out. After the construction of six frigates under the Washington Administration, the United States constructed no new large vessels. However, from 1794 to 1801, Congress, under the Washington and Adams presidencies, appropriated approximately $830,000 on the construction and maintenance of coastal fortifications.[37]

Thomas Jefferson became the president in 1801. His view of the military differed from previous administrations. Jefferson saw a continued need for a naval presence in the Mediterranean, which would require further investment in the navy. However, his view on coastal fortifications was that they were becoming too expensive to build, maintain, man, and equip.[38] In

[35] Puls, *Henry Knox*, 213.

[36] Puls, *Henry Knox*, 215.

[37] Browning, *Two if by Sea*, 12.

[38] Richardson, *A Compilation of the Messages and Papers of the Presidents, 1789-1897,* 330.

contrast to the money appropriated from 1794-1801, Congress allocated $113,000 for the coastal defense projects from 1802-1805.[39] It would be overly expensive to maintain and not flexible enough to respond to threats. The enemy could simply bypass known fortification locations, making the construction of them a waste of time and resources. In his first inaugural address given on December 1, 1801, Jefferson stated that the cost of coastal fortifications made it "questionable what is best now to be done."[40] Considering the lack of integration in planning and construction in the First System, this may not have been far from the truth. The secretary of war under President Jefferson, Henry Dearborn, argued that, "some other system ought to be employed."[41] The idea that appealed most to President Jefferson was the construction of shallow draft gunboats, colloquially called the "mosquito fleet." The design of the gunboats was not for crossing the Atlantic to harry enemy coastlines, but to stay close to the American coast to provide protection at short notice. These gunboats were essentially a maritime militia, theoretically cheaper than permanent fortifications and focused solely on the defense of American commercial and trade centers.[42]

Alfred Thayer Mahan quotes Napoleon in saying "[N]o scheme of defense can be considered efficient that does not provide the means of attacking the enemy at an opportune moment."[43] The mosquito fleet was not capable of protecting anything beyond the coast and, while the First System decayed under the Jefferson Administration, the mosquito fleet grew. The lack of protection for American shipping beyond the shore had impacts everywhere it went,

---

[39] Browning, *Two if by Sea*, 13.

[40] Richardson, *A Compilation of the Messages and Papers of the Presidents, 1789-1897,* 330.

[41] Browning, *Two if by Sea*, 13.

[42] Browning, *Two if by Sea*, 13-15.

[43] Mahan, *Sea Power*, 298.

including interdiction by the French and English seeking to disrupt supplies and the Barbary Coast pirates seeking to plunder and extract bribes. Until the six frigates were completed, American merchantmen operating beyond the coast of the United States were vulnerable to interdiction.

President Jefferson hailed the gunboat system as a cheaper and more flexible alternative to the coastal fortifications, but the reality was much different. By 1807, the coastal fortifications of the First System were in shambles and no longer receiving funding from Congress for new construction or even maintenance. In contrast, the projected cost for building the 177 gunboats authorized by Congress exceeded $1,000,000, compounded with an annual maintenance cost of $2,800,000.[44] It became apparent that a dependence upon small gunboats for the defense of harbors would be too expensive. Protecting the shores of the United States was insufficient to protect transatlantic commercial trade. As American shipping came under increasing attack in the Atlantic and Mediterranean, the small navy proved insufficient to protect American commerce. The mosquito fleet was a small maneuverable force designed to concentrate against the enemy's main effort operating off the American coast. However, with an annual price tag of $2,800,000 and an increase in attacks on shipping beyond the operational reach of the fleet, this option was not a fiscally viable approach. The First System ceased to exist when the financial burden increased and perceived threat dissipated.

The Second System of Fortifications

The First System ended by 1803. A lack of interest within Congress led many of the fortifications to again fall into disrepair. The perceived lack of necessity for fortifications contributed to their decline. The logs rotted away and weathering wore down the earthen forts. Similar to the colonial coastal fortifications constructed in the previous years, the coastal

[44] Browning, *Two if by Sea*, 14.

fortifications of the First System disappeared. Fort Mifflin, Pennsylvania, is one of the few fortifications of the First System existing today.[45]

War between Britain and France erupted during a period when the United States began to lose interest in constructing coastal fortifications. The United States sought to maintain neutrality, but both counties targeted American shipping in an effort to strangle each other's resources. In one of the most outrageous acts, the British frigate *Leopard* engaged the American frigate *Chesapeake* resulting in 21 sailors killed or wounded.[46] Gunboats were no longer enough for the American population making a living on the eastern coast and the demand for coastal fortifications returned. The prophetic message by former Secretary of War Thomas Pickering in 1797 stating that, "only actual or impending war would cause a resumption in building fortifications in some locations but it is prudent to fortify the few ports of the highest importance" began to come true.[47]

The *Chesapeake-Leopard* Affair challenged the idea that America was capable of protecting its all-important overseas trade. British naval vessels interdicted American shipping even within American ports.[48] At the request of President Jefferson, Congress passed legislation to repair and rearm existing fortifications and to construct new ones in order to "protect from insult and injury the persons and property of our citizens living in our seaport towns, or sailing in our own waters, and to preserve therein the respect due to our constituted authorities of the

---

[45] Lewis, *Seacoast Fortifications,* 22-24.

[46] Millet, Maslowski and Feis, *For the Common Defense*, 93-95.

[47] Browning, *Two if by Sea*, 9.

[48] A.T. Mahan, *Sea Power and its Relations to the War of 1812* (Boston: Little, Brown, and Company, 1905), 155-156. The *Chesapeake* was interdicted by the British 50 gun frigate *Leopard* approximately 10 miles off the coast of Virginia, after setting sail and passing by Cape Henry, near Hampton Roads, Virginia.

nation."[49] Congress passed an appropriation in January of 1808 of $1,000,000 for coastal defense.[50] This was the beginning of the Second System of fortification in the United States.

Many of the designs in the Second System were similar to those of the First System. In fact, many of the same French engineers that designed the fortifications in the First System continued their work on the Second. As a matter of national military strategy, however, there was no synchronization in their efforts, although most coastal cities had at least one or two batteries available for protection by 1812.[51] Fortifications of the Second System protected shipping and commerce in key ports, which should have supported locations where the existing batteries were not sufficient.[52] The lack of a national military strategy concerning coastal defense led to a failure in prioritization of efforts and funds. Furthermore, there also was a shortage of trained engineers capable of directing construction efforts. As engineers began to graduate from West Point, the Second System began to take on an American flair.

Congress established the Corps of Artillerists and Engineers in 1794. In the appropriation from Congress, money for books and equipment was included, which satisfied Secretary of War Pickering's idea that "to become skillful in either branch of their profession will require long attention, study and practice."[53] President Jefferson was responsible for the creation of the United States Military Academy at West Point, New York in 1803, where the formal training of American engineers began. One objective for West Point was to reduce the reliance that the

---

[49] "Report of a committee on the expediency of placing the ports and harbors of the United States in a state of defense, November 24, 1807," accessed 10 March 2015, https://archive.org/stream/americanstatepap_e01unit/americanstatepap_e01unit_djvu.txt.

[50] Browning, *Two if by Sea*, 16.

[51] Kaufman and Kaufman, *Fortress America*, 146.

[52] Browning, *Two if by Sea*, 18-19.

[53] Theodore Crackel, *West Point: A Bicentennial History* (Lawrence: University Press of Kansas, 2002), 33.

United States had on foreign officers for technical engineering. Foreign engineers had designed and overseen most of the construction of fortifications of the First System. The initial academic regimen, however, did not educate officers soon enough to assist in the First System. Academics were meager, giving enough technical and scientific instruction to lay artillery properly or to construct simple fortifications.[54] Both of these skills are foundational for constructing a complex structure like a coastal fortification. Some West Point graduates took charge of construction on a few Second System fortifications, making them an American engineering effort.

Initially, the Second System consisted of fortifications with designs consistent with designs of the First System, influenced by French engineer Sebastian Le Prestre de Vauban. Vauban, a French military engineer for Louis XIV, was the preeminent authority of siege warfare in the 18th century. French engineers helping to construct early American fortifications would have studied at the Ecole du Corps Royale du Génie.[55] However, Jonathan Williams, West Point's first superintendent, favored a different form of construction. His influence came from the French engineer Marquis René de Montalembert.[56] Montalembert described his design in *La Fortification Perpendiculaire* to counter the British naval ships of the time. Montalembert added enclosed casemates to his designs and dramatically increased the amount of cannons.[57] Furthermore, Montalembert emphasized fortresses that were perpendicular to the coastline. The shape and amount of guns would be able to overpower British ships, which were at the mercy of the wind and waves, while the fixed position in the fortress could attack with multiple guns at

[54] Crackel, *West Point*, 48.

[55] Marguerita Herman, *Ramparts: Fortification from the Renaissance to West Point* (Garden City Park, NY: Avery Publishing Group, 1992), 62.

[56] Browning, *Two if by Sea*, 17.

[57] Herman, *Ramparts*, 72.

multiple points. [58] Some forts from the First System incorporated changes during the construction of Second System. Fort Norfolk in Virginia is an example of a transitional fort. Constructed as part of the First System, the addition of brick and stone blended it with the new designs of the Second System.[59] Engineers also tore down existing fortifications, such as Fort Jay, New York, and rebuilt the forts with fresh materials and a new design.[60]

The First System of fortifications lasted less than a decade and many of the fortifications suffered the same fate as colonial fortifications. The Second System of fortifications brought together French influence and American trained engineers from the United States Military Academy. American-trained engineers improved the Second System of coastal fortifications with the introduction of a new style. After the War of 1812, many of these fortifications again fell into disrepair. The evolution from the First to Second system affected national military policy from one of protecting local commerce to one of general deterrence.

The Development of the Third System of Fortifications

"Money, credit, is the life of war; lessen it, and vigor flags; destroy it, and resistance dies."

—A.T. Mahan[61]

After the War of 1812, the First System of fortifications was all but gone. The Second System had served its purpose as an emergency means for defense, but it was far from an integrated piece of national defense policy. The construction of the Third System became the

[58] Price, "American Coastal Defense," 21-22. Jonathan Williams is regarded to have translated the first copy of *La Fortification Perpendiculaire* into English for instructing cadets at West Point.

[59] Kaufman and Kaufman, *Fortress America,* 149.

[60] Kaufman and Kaufman, *Fortress America,* 149.

[61] Mahan, *Sea Power,* 285.

basis for a national defense policy. The development of the Third System of fortifications influenced national military policy by developing a deterrent supporting the navy and a small professional army supported by militia. The influence of the Third System was evident in the comprehensive planning that took place to construct it, annual appropriations that Congress provided the project, and the establishment of the Board of Engineers.[62] These actions supported the expressed intent by national leaders that the system would be a long-term project designed as part of the national military policy. All of these elements combined show that the Third System of fortifications influenced national military policy from 1815-1835.

The first way that the Third System influenced national military policy was the through the amount of time given to the project to develop. The War of 1812 spurred the need for a more integrated coastal fortification policy. The relative peace after the war allowed national leaders to reflect on what would be required to construct the system. There was an opportunity to take advantage of the rise in nationalism and prosperity to create a policy that could protect America's coastline and interests abroad. Construction on the Third System began soon after the War of 1812 ended, and the scope of the effort spanned the decades that followed.

Fortifications of the Second System had mixed effectiveness during the War of 1812. The upgraded Fort McHenry at Baltimore, Maryland, with designs from the Second System and reinforced with brick and mortar, withstood British bombardment in 1814.[63] Fortifications that were temporary or that relied on support from Jeffersonian-era gunboats for support were insufficient and typically led to failure and destruction by the British.[64] The construction of the

---

[62] Robert Browning, *Two If By Sea*, 38. The aggregate total of appropriations by 1820 was $8,500,000.

[63] Herman, *Ramparts*, 123.

[64] Mark Smith, "The Corps of Engineers and National Defense in Antebellum America, 1815-1860" (PhD diss, University of Alabama, 2004), 77. Fort McHenry is a prime example of a fortification withstanding a British assault, while the opposite is true for the temporary

Third System would be different. National policy began to take shape, one that considered coastal fortifications as a system built to last for the long-term.

In February of 1815, President James Madison presented Congress with the Treaty of Ghent and took the opportunity to charge it with a new national policy going forward, saying, "a certain degree of preparation for war affords also the best security for the continuance of peace."[65] Congressmen from the seaboard states understood this; it was their constituents that felt the affects of British raiding and blockades most during the War of 1812. Fortifications constructed in a formal style, such as the Vaubanian styled Fort McHenry at Baltimore, Maryland and Fort Bowyer near Mobile, Alabama, had been able to resist British naval operations, while other locations were vulnerable to attack and occupation, such as the national capital in Washington.[66] The goal, according to Madison, would be to build an "adequate regular force, the gradual improvement of the naval force, and for improving all the means of harbor defense."[67] Madison presented to Congress a long-term national military policy designed to defend American sovereignty and deter aggression from foreign powers. Similar to the National Security Strategies published in modern times, Madison did not provide specific solutions. Instead, his proposal presented a framework on how to move forward. In order to make the proposal a reality, it required officers familiar with the problems and capable of providing solutions, such as Colonel Joseph Swift.

---

fortifications established in northeastern Maine at Fort Madison. For more information about various forts during the War of 1812, see Smith, 60-77.

[65] Richardson, *A Compilation of the Messages and Papers of the Presidents: 1789-1897*, vol. 1, 553.

[66] Price, "American Coastal Defense," 28-29.

[67] Richardson, *A Compilation of the Messages and Papers of the Presidents: 1789-1897*, vol. 1, 553.

Colonel Joseph Swift was the first graduate of West Point and became a lieutenant in the Corps of Engineers in October of 1802.[68] Swift served as the Chief of Engineers during the War of 1812 until 1818. Swift was no stranger to the construction of coastal fortifications. In May of 1802, while still a cadet at West Point, the commandant at Newport, Rhode Island, requested a report on the fortifications in Newport Harbor.[69] This was Swift's first opportunity to be involved with coastal fortifications and he completed his report satisfactorily. Until 1815, Chief Engineer Swift had made decisions on locations for the construction of fortifications. His recommendations were rational in the context of the War of 1812 and national emergencies. Swift's goal was to protect key areas that were subject to occupation by British naval forces or major centers of commercial activity.[70] Swift worked to implement the plan outlined by President Madison, however his process was relatively unchanged from the First and Second Systems.

The second way that the Third System influenced the development of a national military policy was through the creation of the Board of Engineers. In November of 1816, the Secretary of War James Monroe notified Swift of Congressional plans to establish a board of engineers for the construction of fortifications.[71] This changed how engineers worked with Congress. In the First and Second Systems, engineers in charge of construction were essentially responsible for the design of the fortifications. Before the establishment of the board, engineers and state officials determined the site and design of construction. The establishment of the Board of Engineers

---

[68] Joseph Swift, *The Memoirs of Gen. Joseph Swift, First Graduate of the United States Military Academy, West Point, Chief Engineer U.S.A. from 1812 to 1818* (Privately Published, 1890), 36.

[69] Swift, *The Memoirs of Gen. Joseph Swift*, 32-33. Swift not only conducted a report on the fortifications, but also concluded that the current positions were insufficient due to funding. Swift reports, "[N]one of sufficient area could have been attempted under a fund of $76,000, nor prosecuted usefully in the three following years."

[70] Smith, "The Corps of Engineers and National Defense," 83-84. Some key locations identified by Swift include Detroit, Baltimore, Savannah, and New Orleans.

[71] Swift, *The Memoirs of Gen. Joseph Swift*, 144.

changed that dynamic by making planning for fortifications a centralized process. The board consisted of five members, with the addition of the local engineer and a naval officer. The local engineer and naval officer had charge of construction at a particular location.[72] The board had the responsibility to make recommendations on the priority of sites for fortifications, assign officers to supervise the construction, and, critical to the Third System, provide design specifications for each site.[73] The board would then submit all plans and reports to the chief engineer and then on to the secretary of war for approval.[74]

This new approach included few people, but it had far reaching effects towards the establishment of a national military policy on coastal defense. During his tenure, Swift made important contributions to the construction of fortifications at particular points, but they were not part of an integrated system of national defense or part of a national defense policy, which placed him at odds with the Board of Engineers.[75] The Board of Engineers began to focus on the defense of the nation as its purpose. Instead of looking at particular points to protect that were critical to trade and commerce, the board looked in much broader terms of how to defend the United States. The system would consider "involving several interrelated elements—a navy, fortifications, avenues of communication in the interior, and a regular army and an organized militia."[76]

Not everyone believed that the creation of the board was the best way to achieve an effective national military policy on coastal defense. One issue was that when appointing

---

[72] Smith, "The Corps of Engineers and National Defense," 100. Naval captain J.D. Elliot was a permanent member of the initial board, but not in subsequent boards.

[73] Timothy Charlesworth, "Defending America's Shores: A Historical Analysis of the Development of the U.S. Army's Fortification System, 1812-1950" (MMAS Thesis, US Army Command and General Staff College, 1988), 13.

[74] Smith, "The Corps of Engineers and National Defense," 100.

[75] Smith, "The Corps of Engineers and National Defense," 84.

[76] Lewis, *Seacoast Fortifications of the United States*, 38.

members to the board, Congress also appointed a foreign officer. Simón Bernard, a French officer from Napoleon's army, a graduate of distinguished military schools in France.[77] Bernard served as an assistant engineer and had no more say on the board than anyone else. Members of Congress defended their selection, arguing that Bernard was to be advisory in nature and he would be a "skillful assistant to the corps of engineers."[78]

The other members of the board consisted of Major Joseph Totten, Major William McRee and U.S. Navy Captain J.D. Elliot. These five members constituted the original Board of Engineers. Jealousy and mistrust made the relationship tense; Swift and McRee resigned their commissions 1818 and 1819 respectively.[79] Local engineers who were knowledgeable about the terrain augmented the Board. Bernard remained with the Board until 1831 and Totten, eventually appointed as Chief Engineer, spent his life dedicated to coastal fortification construction.[80]

Another issue was the opposition in Congress to the funding increase that the creation of the Third System required. Members of Congress feared that the cost of new fortification construction would be too high.[81] At the end of the War of 1812, the national debt was over $100,000,000, and Swift sought $1,600,000 for new construction and repairs.[82] President Madison pressed Congress to find a way to fund a project that would prepare the nation for a war when there was no danger in the near term of such a conflict. Republican William Lowndes, a

[77] Smith, "The Corps of Engineers and National Defense," 94. Bernard graduated from the École Polytechnique in 1795 and the School of Application at Metz in 1799. Bernard had an enormous amount of success in the French army, with over 15 years of experience constructing fortifications and serving as Napoleon's *aide-de-camp*.

[78] Smith, "The Corps of Engineers and National Defense," 85.

[79] Clary, *Fortress America*, 38.

[80] Clary, *Fortress America*, 38.

[81] Smith, "The Corps of Engineers and National Defense," 85.

[82] Smith, "The Corps of Engineers and National Defense," 83-84.

Representative from South Carolina and the Chairman of the Ways and Means Committee, proposed the extension of a direct tax passed to help fund the War of 1812 with the addition of tariffs on specified goods.[83] In December of 1815, a month before signing the direct tax proposed by Lowndes, President Madison gave a public address and recommended to Congress a "liberal provision for the immediate extension and gradual completion of the works of defense, both fixed and floating, on our maritime frontier."[84] This plan passed and President Madison signed the bill along with the naval expansion act of 1816, paving the way for the funding of a long-term building project.[85]

Congress supported these efforts in earnest, appropriating $838,000 in 1817.[86] The support from Congress funded initial surveys conducted by the board. These surveys focused on defensive plans around the Gulf Coast, in particular Mobile Bay and other locations that would ensure undisputed control of the Mississippi.[87] The critical port of New Orleans had older forts of the second system for protection that were, in the opinion of the board of engineers and General Bernard, no longer adequate. Because New Orleans was the largest city and main commercial port on the Gulf, the priority for defensive fortifications went there first. The plan submitted by the board is one of the first examples of a defense plan that integrated defenses along the coast

[83] Juliet Ravenel, *The Life and Times of William Lowndes of South Carolina, 1782-1822* (Boston: The Riverside Press, 1901), 155. This particular course was contentious with a general fear from other congressman that the continued use of spending that was appropriated during a conflicted and used after the conflict was over would result in an increased growth of a military establishment. Some of the arguments against the tax were that it harmed various industries, such as the agricultural industry or cotton production. For a more detailed reading on the debates, see Ravenel, 145-160.

[84] Richardson, *A Compilation of the Messages and Papers of the Presidents: 1789-1897*, vol. 1, 566.

[85] Smith, "The Corps of Engineers and National Defense," 86n13.

[86] Smith, "The Corps of Engineers and National Defense," 104. This was the highest single appropriation to date.

[87] Price, "American Coastal Defense," 69.

designed to protect against naval operations and potential landings and support from other states in the form of militia and regular forces.[88] The fortifications proposed were located on defensible points such as Rigolets, Chef Menteur Pass, and Bayou Rinevenue (see Figure 1 on page 26).[89] Engineers submitted reports on the region, provided them to Congress, and construction began in 1818.

Another region rich in commerce and vulnerable to attack that the board of engineers focused on was the lower Chesapeake Bay area. The area overlooked approaches to the naval yard at Norfolk and anchorage at Hampton Roads.[90] The construction of Fort Monroe was part of an integrated series of planned fortifications. At Fort Monroe, engineers experimented with integration of an artificial island at a place called Rip Rap Shoals. Though the fortification on the shoals was never completed, this was an early example of the planning for an integrated system began with the board of engineers.[91]

[88] Smith, "The Corps of Engineers and National Defense," 103. One reason that the plan integrated forces not local to the area was the assumption that the demographic makeup of the area would be weak to oppose an invasion. Troops from other areas of the United States would be required to fully repel an invasion.

[89] Price, "American Coastal Defense," 69.

[90] Price, "American Coastal Defense," 78. This construction at Old Point Comfort was renamed after President James Monroe.

[91] Price, "American Coastal Defense," 82.

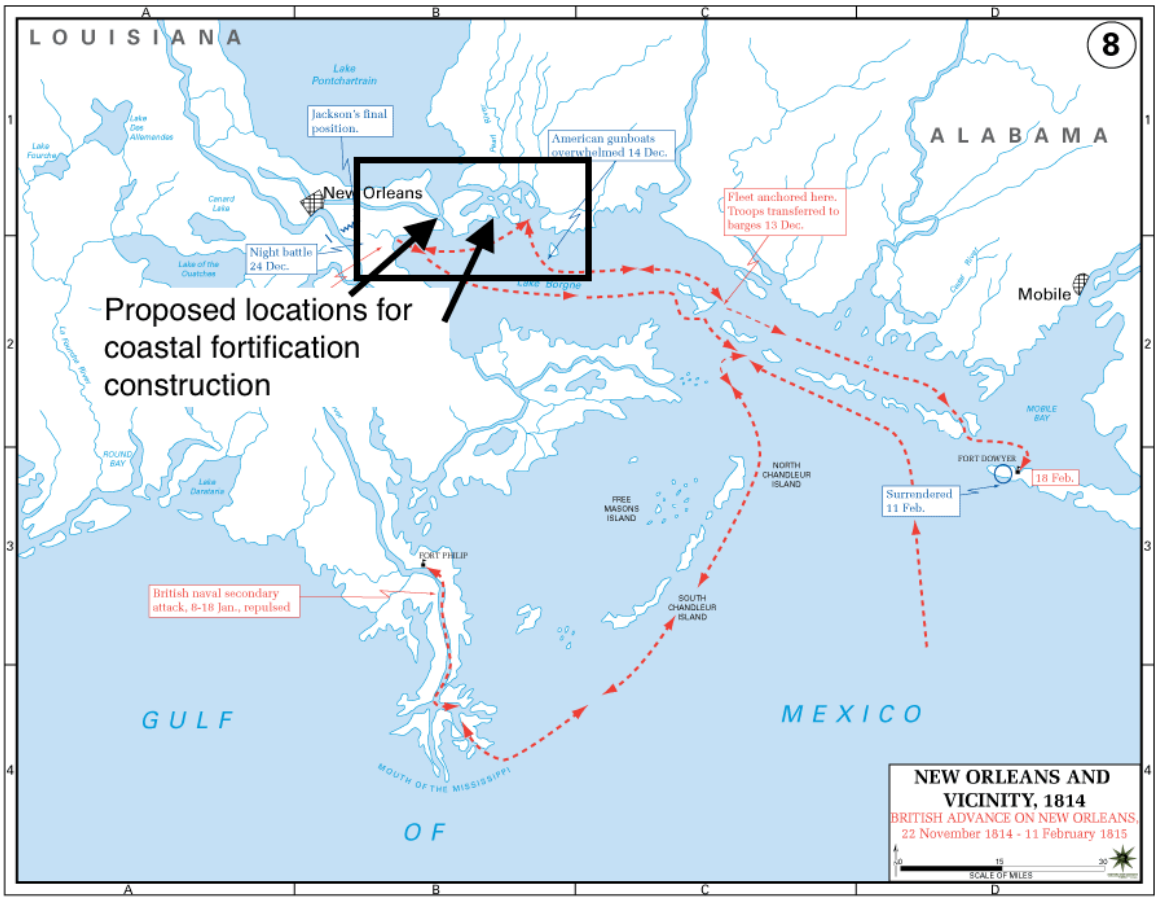

Figure 1: Defensible points at Rigolets, Chef Menteur Pass, and Bayou Rinevenue.

Source: Map from West Point Department of History Atlases, "The British Advance on New Orleans, 22 November 1814 – 11 February 1815", accessed 31 March 2015, http://www.westpoint.edu/history/SiteAssets/SitePages/War%20of%201812/BritAdvanceNewOrleans.gif.

The monetary support that the board of engineers enjoyed was not unending. In 1819, a financial crisis hit the United States. Almost immediately, calls rang out in Congress for a reduction in the defense budget. While congressman could comprehend the rationale behind the construction of an entire system of fortifications that would protect every shore and every port from invasion, fiscal reality set in. When appropriating funds for these fortifications, it was not a

one-time affair because it often took many years to complete large projects. In 1834 when Fort Monroe was finally completed, the total cost was $2,402,500.[92]

Congress realized that the annual appropriation of a lump sum for fortifications was not the end of a particular project in the budget cycle.[93] In addition, this was something over which Congress wanted to exercise more oversight. Appropriations for new construction would eventually be the result of Congressional approval for each location, versus the lump sum plan. Congress, seeking to be more judicious with appropriations, challenged many of the Board of Engineers' recommendations, withholding or reducing appropriations for various projects that they did not see as critical.[94] The practice of submitting reports on surveys to Congress was no longer sufficient.

The third way that the Third System contributed to the development of a national military policy was the publication of the Bernard, Elliot, and Totten Report of 1821. The increased scrutiny from Congress as well as budgetary reductions compelled the board of engineers to produce a more formal report to Congress. Congressman Thomas Butler party from Louisiana requested a report from the secretary of war in reference to the progress of the Board of Engineers. The board submitted the first report, better known as the Board Report of 1821 or the Bernard Report.[95] The Board Report of 1821 set forth in writing the Board of Engineer's coastal fortification plans for national defense. This comprehensive plan addressed many of the major

[92] Price, "American Coastal Defense," 81.

[93] Smith. "The Corps of Engineers and National Defense," 105-106.

[94] Spiller, "John C. Calhoun as Secretary of War," 129-130. Congressman did not see the value in fortifying Dauphin Island, located near Mobile, due to the topography found on map locations, despite the reports from Bernard and the other engineers. Calhoun shifted money from other sources, and in response, Congress cut the fortification budget from $8000,000 in 1820 to $200,000 in 1821 effectively killing the Dauphin island project.

[95] Smith, "The Corps of Engineers and National Defense," 106. The official title of the document is "Information in Relation to The Progress of the Board of Engineers, In the Selection of Sites of Fortifications." This document will be referred to as Board Report of 1821.

concerns brought up in Congress, such as the tiered system that the Board proposed and the amounts of money over time. More importantly, the Board Report of 1821 provided Congress a roadmap to an even more comprehensive national military policy. This included the establishment of coastal defenses, the size of the professional army augmented by the militia, and the primacy of the navy. The report provided Congress with six conditions that the fortifications proposed had to meet:

> 1. To close important harbors to an enemy and secure them to the navy of the country
> 2. To deprive an enemy of strong positions, where, protected by his naval superiority, he might fix permanent quarters in our territory, maintain himself during the war, and keep the whole frontier in perpetual harm.
> 3. To cover our great cities against attack.
> 4. To prevent, as much as possible, the great avenues of interior navigation from being blockaded, by a naval force, at their entrances into the ocean.
> 5. To cover the coastwise an interior navigation; and give to our navy the means necessary for protecting this navigation.
> 6. To cover the great naval establishments.[96]

The publication of the Board Report of 1821 highlighted to Congress that the past systems of fortifications were inadequate. In the report the authors stated, "most of the existing forts only defend single points, and satisfy only a few essential conditions," and that their report shows "the importance of establishing a complete system for the protection of the frontiers, and the necessity of building this system upon principles harmonizing with the modern system of warfare." [97] The board's members were thinking comprehensively about national defense.

The costs associated with the construction of the fortifications amounted to approximately 11% of the total military spending by 1820.[98] As high as those costs appeared to be, particularly when considered against the recent cuts to the military budget, opponents of the

---

[96] Simón Bernard, J.D. Elliot, and Joseph Totten, "The Board Report of 1821" (Washington, DC: Gales & Seaton, 1821), 6.

[97] Bernard, et al., "Board Report of 1821," 5.

[98] Browning, *Two if By Sea*, 38.

fortification system could not get much traction.[99] One thing the Board Report of 1821 did well was to provide Congress with a cost for the construction of the fortifications as well as an estimated cost to either keep troops in the field for defense, or, in the worst-case scenario, an estimated loss to commerce if the fortifications were not built. For those who would argue that there was not a current threat and it was not, therefore, necessary to pursue such an expensive endeavor, this was a convincing argument. For example, the report describes a scenario in which 67,000 regular and militia troops are required to serve for a period of six months. At the average pay rate of $200 per month for officers and men, the amount required to protect planned fortification locations would be $16,750,000 plus the loss in labor force, versus $5,658,000 required to pay the garrisons of the fortifications.[100]

The development of the Third System after the War of 1812 was a defining moment for the national defense policy of the United States. Before the establishment of the Board of Engineers, little thought was put towards ensuring fortifications were able to support a coherent plan for defense. The first way that the Third System contributed to the development of national military policy is that American political leaders considered a long-term policy of defense. The second way the Third System contributed to the development of national defense policy was the development of the Board of Engineers. This changed the approach to coastal defense. Instead of focusing on individual points, the board recommended a holistic approach, considering how the system could work together. The third way that the development of the Third System contributed to the development of national military policy was through the Congressional debates and appropriations. The fourth was the submission of the Board Report of 1821. The Board Report of 1821 outlined the cost to build a true system, set priorities for construction, and outlined how to accomplish the task. Amidst tight economic times, support continued for the construction of the

[99] Browning, *Two if By Sea*, 38.

[100] Bernard, et al., "Board Report of 1821," 15-16.

system. Congress supported the creation of a long-term system of fortifications proposed by President Madison and President Monroe.

The Board Report of 1821 and the Third System

"A work of such magnitude must, with every possible effort, be the work of years; but each year, with limited means, will produce its fruit, and the final result is to endure for ages."
—The Board Report of 1821[101]

The Board Report of 1821 provided the purpose and direction for American national military policy. For the next 30 years, the report guided the construction of coastal fortifications of the Third System, making it a priority for long-term development. President James Monroe, a champion of developing coastal defense as a long term strategy, wrote "[T]he late war has shewn our vulnerable parts, or rather our defenseless situation…. [I]f we neglect the opportunity it is easy to forsee the consequences."[102] This long-term strategy would rely on deterrence. An "integrated system of coastal fortifications" would be a strong deterrent for an adversary who needed access to a lodgment to prosecute an effective campaign.[103]

The Board Report of 1821 provided Congress a response to Congressional questions about appropriated money. Congress understood that the nation began a long-term project designed to protect the nation's shores. Over the long-term, defense was not strictly the construction of fortifications. The report recommended coastal fortifications as the first priority. The first line of defense for the nation, according to the Board Report of 1821, ought to be the

[101] Bernard, et al., "Board Report of 1821," 13.

[102] Stanislaus Murray Hamilton, ed, *The Writings of James Monroe, Including a Collection of his Public and Private Papers and Correspondence now for the First Time Printed* vol. 5 (New York: G.P. Putnam's Sons, 1901), 324-325.

[103] Smith, "The Corps of Engineers and National Defense," 109-110.

navy.[104] Fortifications were secondary, supported by a regular force and militia that could reach critical points by way of an established road and water network.[105] To put all of theses pieces together required an extensive amount of time and planning. The Board Report of 1821 prioritized the efforts that allowed for long-term development.

The navy was to be the first line of defense for the United States, similar to how the Royal Navy had protected the American colonies. The economy of the United States was heavily reliant on the trade that moved across the seas from the economic and commercial centers on the coasts. After the War of 1812, the navy continued to provide critical protection of American commerce. Congress was reluctant to cut the naval budget even during the Panic of 1819.[106] Until the Board Report of 1821, the different priorities had competed for minimal resources. The report helped to prioritize these efforts, stating that even though the navy was the nation's first line of defense, it was more important to construct the fortifications first, and then turn attention to constructing a stronger navy.

The Board Report separated the coastal fortification projects into three tiers. First-tier projects were those that the board found critical to the defense of a lodgment, the protection of a naval yard or a critical commercial center. The board wrote:

> [I]n classing them we shall observe that the works of the most urgent necessity are those which are destined to prevent an enemy in time of war from forming a permanent establishment, or even a momentary one, on the soil of the Union; those which defend our great naval arsenals; and those which protect our chief commercial cities.[107]

---

[104] Bernard, et al., "The Board Report of 1821," 5.

[105] Bernard, et al., "The Board Report of 1821," 5.

[106] Harry Ammon, *James Monroe: The Quest for National Identity* (New York: McGraw-Hill, 1971), 472. The budget for the navy in 1819 was $3,800,000, and was cut only to $3,300,000 in 1821.

[107] Bernard, et al., "The Board Report of 1821," 14.

The first-tier determined locations that would prevent an invasion force from being able to establish a lodgment, and to defend naval arsenals and chief commercial centers. These locations included fortifications along the Chesapeake Bay, New Orleans and New York, had an estimated cost of $3,010,054.[108] The second-tier proposed to defend naval stations and other commercial centers. These locations included locations around Baltimore and South Carolina, projected to cost $4,711,051.[109] The third-tier consisted of other works that would ensure control of the waterways around the rivers and major waterways, with a total cost of $5,073,970.[110] The total cost, according to the report, would be approximately $17,795,055.[111] The areas identified by the board were critical because they could protect naval vessels, which were weaker than potential opponents' vessels, particularly those of the Royal Navy.

The first-tier fortifications were the first line of defense meant to support the navy as it slowly built capacity over time and to defend the great naval arsenals.[112] Norfolk, Virginia and Boston Harbor, Massachusetts are two examples of locations that met the criteria of first-tier fortifications. Boston Harbor saw the construction of Fort Warren, Fort Independence and Fort Winthrop. These fortifications were capable of garrisoning thousands of soldiers, were built from granite, brick and mortar, and armed with hundreds of cannons and howitzers.[113] Newport and Narragansett Bay, Rhode Island, which Totten believed was the "best harbor on the entire coast of the United States," engineers constructed one of the largest fortifications designed during the Third System, Fort Adams, New York, where multiple islands surrounded the harbor, required

[108] Bernard, et al., "Board Report of 1821," 13.

[109] Bernard, et al., "Board Report of 1821," 13.

[110] Bernard, et al., "Board Report of 1821," 13.

[111] Bernard, et al., "Board Report of 1821," 13.

[112] Smith, "The Corps of Engineers and National Defense," 108.

[113] Kaufman and Kaufman, *Fortress America*, 209.

multiple fortifications for defense.[114] Engineers integrated old fortifications of the First and Second system as well as new designs, including Fort Diamond (later renamed Fort Lafayette), Fort Schuyler, and Fort Totten.[115] All of these were of the first-tier and thus top priority. However after ten years of construction, only two forts out of eleven were finished.[116]

Construction of coastal fortifications continued slowly from 1821 to 1830, but it did not have an interruption in funding through appropriations. The army, however, did not fare as well. After the Panic of 1819 and the following years of retrenchment, Congress reduced the size of the standing army considerably from nearly 12,000 officers and men to 6,000.[117] The reduction in the standing army made the establishment of coastal fortifications an easier argument. The establishment of permanent fortifications alleviated some of the strain by reducing the number of soldiers required to hold a particular position. According to the Board Report of 1821, the manpower required to garrison the fortifications of the first-tier during times of peace was 2,540.[118] The report did caution that garrisons would be required to expand during times of war. An example is Fort Hamilton on Long Island, which was a first-tier fort. This fort required an estimated 800 soldiers to man during times of war.[119] This supported Secretary of War Calhoun's

[114] Kaufman and Kaufman, *Fortress America*, 211. Fort Adams would call for 2,400 soldiers to garrison it and could hold up to 468 cannons of various calibers.

[115] Kaufman and Kaufman, *Fortress America*, 213-215.

[116] John R. Weaver, *A Legacy of Brick and Stone: American Coastal Defense Forts of the Third System, 1816-1867* (McLean, VA: Redoubt Press, 2001), 51.

[117] Spiller, "John C. Calhoun as Secretary of War," 282-283. Voted on 23 January 1821 by a vote of 109-48.

[118] Bernard, et al., "The Board Report of 1821," 13.

[119] Kaufman and Kaufman, *Fortress America*, 396. Fort Hamilton defended potential landing sites on Long Island. Robert E. Lee expanded the fort in 1841.

proposal to Congress on an expansible army.[120] The idea of the expansible army came during the fiscal reductions which threatened to dismantle the standing army altogether. Calhoun proposed retaining nearly all of the army officer corps, augmenting it and the small, remaining regular force with militia when necessary.[121] The construction of permanent fortifications required fewer troops to garrison and influenced the decision to reduce the size of the army.

Another impact of the Board Report was in economic development. Bernard concluded that "[T]he defense of our maritime frontier by permanent fortifications, and even the expense of erecting these fortifications, will thus be a real and positive economy."[122] The report suggested that construction along the seacoast and within key commercial centers would create jobs and a demand for goods, and that the construction of interior lines of communication through the improvement of roads and waterways would provide a more efficient means of transporting goods.[123] Congressman soon saw the advantage of this and sought to leverage military appropriations for roads in canals in their districts.[124] This recommendation of the Board Report was critical, since it was necessary to quickly move troops in order to concentrate on the enemy. Moreover, the construction or improvement of internal lines of communication would also create an economic benefit by opening up the interior of the United States to the ports and centers of commerce. This became so important that, after passing the General Survey Act in 1824, President Madison established another board of engineers, the Board of Engineers for Internal

---

[120] Roger Spiller, "Calhoun's Expansible Army: The History of a Military Idea" in *Warfare in the USA: 1784-1861*, Samuel Watson, ed. (Burlington, VT: Ashgate, 2005), 199-201.

[121] Spiller, "John C. Calhoun as Secretary of War," 277. The total number of officers and men for the base force would be near 7,000.

[122] Clary, *Fortress America*, 40.

[123] Bernard, et al., "The Board Report of 1821," 5.

[124] Clary, *Fortress America*, 40.

Development.[125] The board initially had Bernard and Totten on it, as well as John L. Sullivan, a civilian engineer.[126] This allowed Bernard and Totten to see national military policy as a whole. The downside was as demand grew exponentially for more projects, there were not enough engineers available.

The second way that coastal fortifications influenced national military policy was by increasing the demand for trained, quality engineers. The establishment of West Point in 1802 was contestable. Though President Jefferson was against a military establishment, he saw some value in training military officers as engineers.[127] As late as 1823, however, there was no place in the curriculum for civil engineering. A push for West Point to include civil engineering as part of the curriculum had been growing for a few years. Rufus King, a member of the Board of Visitors to West Point, stated, "[I]f instead of confining the studies to mere military mathematics, the branch of civil engineering were taught, great public benefits would be derived from this Academy."[128] Major Sylvanus Thayer, superintendent at West Point, resisted pressure to add it, arguing against any changes to the curriculum by stating:

---

[125] Mark Smith, "The Corps of Engineers and National Defense," 113-114. The General Survey Act was a continuation of a series of efforts by Calhoun to achieve internal improvements. Much of the information and recommendations were taken from the "Reports on Roads and Canals" written in 1808 by Albert Gallatin. The Cumberland Road is a product of this. For more detailed information on the report see *Roads, Rails, and Waterways: The Army Engineers and Early Transportation* by Forest G. Hill, (Norman, OK: University of Oklahoma Press, 1957).

[126] Hill, *Roads, Rails, and Waterways*, 49.

[127] Theodore Crackel, *West Point: A Bicentennial History* (Lawrence: University Press of Kansas, 2002), 98. Theodore Crackel also suggests that Jefferson supported the establishment of West Point as a way to break the Federalists grip on government institutions. See Crackel chapter two for more on the founding and background from Jefferson.

[128] Crackel, *West Point: A Bicentennial History*, 97-99. The Board of Visitors consisted of senior officers in the Army and Navy, educators and scientists, and members of Congress and were invited annually to West Point to inspect the Academy and report their findings to the Secretary of War.

> [T]hose who are not satisfied with the existing course of studies have not reflected upon the nature and object of the Institution and have not considered that this is a special school designed solely for the purpose of a military education.[129]

The General Survey Act of 1824 forced a change. The act required West Point to include civil engineering to meet the expanding demand from Congress. In making arguments for the General Survey Act, Congressman Joseph Hemphill pointed to the Corps of Engineers to conduct surveys, stating directly "young cadets, as they leave West Point, can be employed. It will give them experience and advance their usefulness to their country" and by employing them, it would "obviate the necessity of employing foreign engineers."[130] West Point obliged, and instituted a course on civil engineering in 1824.[131]

An outcome of the recommendation by the Board Report of 1821 was that more cadets be commissioned into the Corps of Engineers. The requirement to have an engineer at each project, in addition to engineers assigned to survey projects, cemented West Point's place as main contributor to trained engineers. Richard Delafield, Robert E. Lee, and Andrew Talcott all served much of the careers supervising the construction of coastal fortifications. President John Adams envisioned a military academy to produce more engineers supporting increases in public works, and likened West Point to "the nursery of military science and civil engineering as an auxiliary branch of this science."[132]

Coastal fortifications also influenced national military policy through the presentation of a clear strategy. The Board Report of 1821 clearly outlined a broad approach. Supporting a navy

---

[129] Crackel, *West Point: A Bicentennial History*, 97. Thayer went on to say that "they might be usefully employed as Civil Engineers ether in the service of the General Government or of the States," but was implying that the education received at West Point may have established them as competent in the field of civil engineering.

[130] Hill, *Roads, Rails, and Waterways*, 43.

[131] Crackel, *West Point: A Bicentennial History*, 99.

[132] Hill, *Roads, Rails, and Waterways*, 71.

first policy required the construction of coastal fortifications. However, it was evident that it would be fiscally and physically impossible to construct fortifications at every vulnerable point. Captain Alfred Thayer Mahan noted that the importance of having a strong coastal defense in conjunction with a strong navy was critical for providing security along a maritime frontier.[133] The strategy proposed to protect the navy of the United States, allowing it to strike against an opposing navy at a time of advantage. Strong fortifications would also make it difficult for an opposing navy to concentrate its forces against a single point.

The existence of a strong coastal defense would also deter aggression from foreign powers. While it is not possible to measure something that did not happen, it is worth noting that before the construction of an integrated system of coastal fortifications, the United States suffered because of enemy naval action. After the establishment of the Third System, the threat of invasion over the ocean declined and the United States' economic centers flourished. The United States did not explicitly say against what foreign power the coastal fortifications intended to deter. However, the Board Report of 1821 does provide an insight, and it was clearly toward the British. The Board Report of 1821 addresses a couple of scenarios from where an attack would originate. These locations were Halifax and Bermuda, both of which were in British control in 1821.[134] The advantage that the construction of coastal fortifications provided was that no matter which place an enemy concentrated, the critical ports, naval yards, and centers of commerce protected long enough for troops to move to the area. It did not matter if the British concentrated in Bermuda, Halifax, or both because there would be sufficient means of resistance no matter the landing spot. The Board Report concluded that foreign invasion would be less likely because there was a less reasonable chance of success.

---

[133] Mahan, *Sea Power,* 209.

[134] Bernard, et al., "The Board Report of 1821," 14.

As fortification projects were completed new ones were began. The original Board Report of 1821 called for 50 works to be constructed and by 1831 that number had increased to 90. As part of Congressional support to a national defense policy, the appropriations met with only some debate. There were no debates on appropriations in 1829 and 1830, and, from 1831-1833, debate focused on appropriations for the armament of fortifications.[135]

An unanticipated threat to the Third System came not from the ocean but from American expansion westward. During the 1820s, the federal government received much of its income from the sale of lands in the west as well as tariffs on goods leaving commercial ports in the east.[136] Congressman representing western states worked with those of southern states to reduce the budget of the federal government. The fortification budget became a prime target for these cuts. The Committee of the Whole was responsible for appropriating money to the various works, and this committee saw some contentious debating in 1834.[137] Congressman Henry Pinckney's party from South Carolina threatened to strike out the $50,000 appropriation for fortifications at Charleston because "it was utterly useless unless it was intended that they should be used, as they had been, not outward to the ocean but against the citizens themselves."[138] Western lawmakers agreed, arguing that their constituents did not see any benefit from the money spent on coastal fortifications. Kentucky Congressman Albert Hawes stated, "the House had had a large ox killed, and the West had been invited to the feast; but they were told they must be contented with the tail."[139] These debates caused a delay in appropriations by a year, affecting construction times.[140]

---

[135] Smith, "The Corps of Engineers and National Defense," 164n5.

[136] Smith, "The Corps of Engineers and National Defense," 166-168.

[137] Smith, "The Corps of Engineers and National Defense," 167.

[138] Smith. "The Corps of Engineers and National Defense," 167.

[139] Smith, "The Corps of Engineers and National Defense," 170.

[140] Smith, "The Corps of Engineers and National Defense," 172.

More debate followed in 1835 centering on where funding was going. Some Congressman wanted to appropriate money for new projects, such as Florida delegate Joseph White, while others, such as Tennessee Congressman William Dunlap, party, argued that funds should be appropriated to complete projects already started before beginning new ones.[141]

Another problem was that almost none of the fortifications were fully armed.[142] Some of the designs called for hundreds of cannons and were very expensive. Fort Warren, Fort Adams, and Fort Schulyer, all tier-one fortifications, needed a combined total of 1,116 cannons.[143] Delays in construction met with delays in providing the necessary armament.[144] These debates ultimately resulted in a failure to pass an appropriations bill in 1835.

The Board Report of 1821 set the foundation for a coherent national defense policy in the United States. This policy placed an emphasis on an integrated system built over an extended period, on the education and training of officers at West Point for service in the Corps of Engineers, and by describing a clear strategy. Congress considered appropriations annually, but understood the long-term process for the systems' construction. Congress directed West Point to adopt civil engineering as part of its curriculum to meet the demands. In addition, while not explicit in describing a particular foreign enemy, the coastal fortification plan provided a strategy to oppose an attack on naval yards and centers of commerce from a foreign navy that was capable

---

[141] Price, "American Coastal Defense," 116.

[142] Lewis, *Seacoast Fortification*, 65-66. $20 million had been spent on the construction of fortifications, and few were armed. Lewis attributes this to a lag in production as well as lack of necessity. Fort Pulaski, for example, was designed for 146 cannons, but only had 20 actually installed.

[143] Kaufman and Kaufman, *Fortress America*, 398. These numbers represent the planned numbers for the fortifications. Actual numbers present were consistently less.

[144] Clary, *Fortress America*, 42. Fort Monroe alone would require 412 guns in times of war.

of carrying out such an effort. These components were critical to the influence of coastal fortifications on national military policy.

Conclusion

Coastal fortifications were critical to the development of national military policy. The establishment of permanent coastal fortifications was not a legacy left by the British Empire. Many fortifications constructed were temporary in nature, used for a short time then left to deteriorate. The American colonies had been able to rely on the British navy for the protection of their commerce until the American Revolution. This changed when the Royal Navy was no longer protecting American commerce, but attacking it. American and French engineers worked together to construct fortifications of the First System. After the abandonment of the First System, the Second System was constructed. The Second System performed with mixed results during the War of 1812. Some fortifications withstood bombardments from the Royal Navy, while others, such as Fort Washington on the Potomac, were ineffective because of their location.[145]

The Board Report of 1821 outlined a significant change for the United States on its approach to national military defense. Already four years into construction of the Third System, the Board Report demonstrated a course for the establishment of true system. This system not only developed coastal fortifications for the protection of commerce, but also included the fortifications into a larger system as a matter of policy. The Board Report explicitly stated that the navy would be the primary means of defense for the United States. However, without coastal fortifications that provided safe harbor and a place to refit, the navy would always be at risk. Other points that made this clear, long-term policy was the inclusion of a regular force able to augmented by militia. The small, regular force was appealing to a Congress that was constantly facing fiscal constraints. The Board Report argued that a small peacetime regular force would be

[145] Kaufman and Kaufman, *Fortress America,* 167.

sufficient and more cost effective to maintain the fortifications. The final piece of the policy was the construction and improvement of internal road and waterways. During times of peace, these improvements would spur economic growth and serve to integrate areas of the interior with the economic centers on the coast. During times of war, the army would use these internal lines of communication to quickly move forces.

Congress had to support the policy through appropriations in order to implement the recommendations of the Board Report. Congress did so nearly every year. Despite some political discourse over the utility of the expensive fortifications and positioning of some politicians to have their constituents best represented, the end result was a consistent flow of money supporting the construction of coastal fortifications. From 1815-1835, Congress not only supported the plan outlined in the Board Report of 1821, it supported the expanded costs in subsequent reports. The coastal fortifications constructed during the Third System contributed to a long-term national defense policy for the United States.

Bibliography

Primary Sources

Madison, James. 1789-1817. *Messages and Papers of the Presidents, 1789-1817*. Edited by James Richardson. 2 vols. Washington, DC: Government Printing Office, 1896.

Monroe, James. *The Writings of James Monroe, Including a Collection of his Public and Private Papers and Correspondence now for the First Time Printed*. Edited by Stanislaus Hamilton. New York: G.P. Putnam's Sons, 1901.

Ravenel, Juliet. *The Life and Times of William Lowndes of South Carolina, 1782-1822.* Boston: The Riverside Press, 1901.

Swift, Jonathan. *The Memoirs of Gen. Joseph Swift, First Graduate of the United States Military Academy, West Point, Chief Engineer, U.S.A. from 1812-1818.* Privately published, 1890.

US Congress, House. 1821. Information in Relation to the Progress of the Board of Engineers, in the Selection of Sites of Fortifications. 16th Congress.

US Congress. House. 1807. Report of a Committee on the Expediency of Placing the Ports and Harbors of the United States in a State of Defense. 10th Congress. 1st sess.

Secondary Sources

Arthur, Robert. "Colonial Coast Forts of the South Atlantic." *The Coast Artillery Journal* 70, no. 1 (January 1929): 41-63.

———. "Coast Forts of Colonial Massachusetts." *The Coast Artillery Journal* 58, no. 2 (February 1923): 101-122.

Ammon, Harry. *James Monroe: The Quest for National Identity*. New York: McGraw-Hill, 1971.

Browning, Robert. *Two if by Sea: The Development of American Coastal Defense Policy*. Westport, CT: Greenwood Press, 1983.

Crackel, Theodore. *West Point: A Bicentennial History*. Lawrence: University Press of Kansas, 2002.

Charlesworth, Timothy. "Defending America's Shores: A Historical Analysis of the Development of the US Army's Fortification System, 1812-1950." MMAS thesis, US Army Command and General Staff College, 1988.

Clary, David. *Fortress America: The Corps of Engineers, Hampton Roads, and the United States Coastal Defense*. Charlottesville: University Press of Virginia, 1990.

Duffy, Christopher. *The Fortress in the Age of Vauban and Frederick the Great, 1660-1789.* London: Routledge & Kegan Paul, 1985.

Hamilton, Murray Stanislaus, ed, *The Writings of James Monroe, Including a Collection of his Public and Private Papers and Correspondence now for the First Time Printed* vol. 5 New York: G.P. Putnam's Sons, 1901.

Herman, Marguerita. *Ramparts: Fortification from the Renaissance to West Point.* Garden City Park, NY: Avery Publishing Group, 1992.

Hill, Forest. *Roads, Rails, and Waterways: The Army Engineers and Early Transportation.* Norman: University of Oklahoma Press, 1957.

Kaufman, J.E. and Kaufman, H.W. *Fortress America: The Forts that Defended America, 1600 to the Present*. Cambridge, MA: Da Capo Press, 2004.

Lewis, Emmanuel. *Seacoast Fortifications of the United States: An Introductory History*. Annapolis: Naval Institute Press, 1970.

Mahan, A.T. *Sea Power in its Relations to the War of 1812*. Boston: Little, Brown, and Company, 1905.

Millet, Allan, Maslowski, Peter, and Freis, William. *For the Common Defense: A Military History of the United States from 1606-2012*. New York: Free Press, 1984.

Price, Russell. "American Coastline Defense: The Third System of Fortification, 1816-1864." PhD diss., Mississippi State University, 1999.

Puls, Mark. *Henry Knox: Visionary General of the American Revolution*. New York: Palgrave Macmilan, 2008.

Russo, Joseph. *Continental Defense of the United States: A Summary History From the 1700s through 1990.* El Paso: n.p., 1992.

Spiller, Roger. "John C. Calhoun as Secretary of War, 1817-1825." PhD diss., Louisiana State University, 1977.

———. "Calhoun's Expansible Army: The History of a Military Idea". In *Warfare in the USA: 1784-1861*. Edited by Samuel Watson. Burlington, VT: Ashgate Publishing Company, 2005.

Smith, Mark Andrew. "The Corps of Engineers and National Defense in Antebellum America, 1815-1860." PhD diss., University of Alabama, 2004.

Weaver, John. *A Legacy of Brick and Stone: American Coastal Defense Forts of the Third System, 1816-1867.* McLean, VA: Redoubt Press, 2001.

Wilson, Eben. "Lectures on Seacoast Defense" in *Occasional Paper 35*. Washington, DC: Press of the Engineer School, 1909.